



107 ABS DIAGNOSIS AND SERVICE

TECH TIP

Quick and Easy Wheel Speed Sensor Diagnosis

A fault in a wheel speed sensor (WSS) is a common ABS problem. A quick and easy test that works on most Bosch ABS systems (and perhaps others) involves the following steps:

- STEP 1** Hold the vehicle safely.
- STEP 2** Turn the ignition on (engine off).
- STEP 3** Spin a tire by hand as fast as possible.
- STEP 4** The ABS amber warning light should come on, indicating that a speed was detected but not by all the wheel speed sensors.
- STEP 5** Turn the ignition off to reset the ABS warning light.
- STEP 6** Repeat the test on each of the remaining wheels.

If any wheel fails to turn on the ABS light, carefully inspect the wheel speed sensor for proper resistance and the tone ring and wiring. If the ABS light is on at the time and does not reset when the ignition is turned off, the problem is not caused by a wheel speed sensor.

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FREQUENTLY ASKED QUESTION

What's That Noise and Vibration?

Many vehicle owners and service technicians have been disturbed to hear and feel an occasional groaning noise. It is usually heard and felt through the vehicle after first being started and driven. Because it occurs when first being driven in forward or reverse, many technicians have blamed the transmission or related driveline components. This is commonly heard on many ABS vehicles as part of a system check. As soon as the ABS controller senses speed from the wheel speed sensors after an ignition cycle is on, the controller will run the pump either every time or whenever the accumulator pressure is below a certain level. This can occur while the vehicle is being backed out of a driveway or being driven forward because wheel sensors can only detect speed—not direction. Before serious and major repairs are attempted to “cure” a noise, make sure that it is not the normal ABS self-test activation sequence of events.

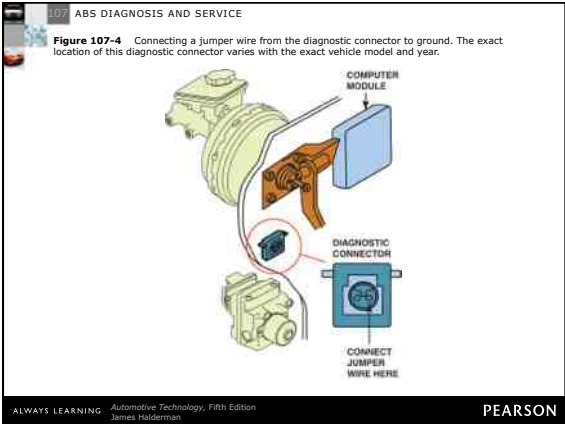
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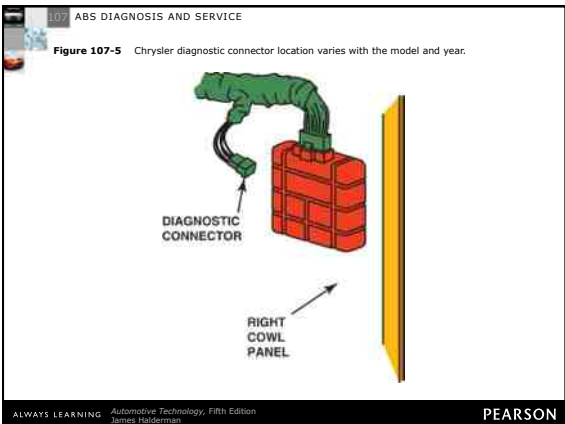
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Figure 107-3 General Motors diagnostic connector on a pre-1996 vehicle. Flash codes are available by using a jumper wire to ground (terminal A) to terminal H.

The diagram shows a blue diagnostic connector with two terminals labeled 'H' and 'A'. A yellow tool labeled 'A-H TOOL' is shown with a wire connecting terminal 'A' to terminal 'H'. The tool has 'CABLE A-H' written on it.

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REAL WORLD FIX

RWAL Diagnosis

The owner of an 8-10 pickup truck complained that the red brake warning lamp on the dash remained on even when the parking brake was released. The problem could be one of the following:

1. A serious hydraulic problem
2. Low brake fluid
3. A stuck or defective parking brake switch
4. If the brake lamp is dim, RWAL trouble is indicated.

The technician found that the brake lamp was on dimly, indicating that an antilock braking problem was detected. The first step in diagnosing an antilock braking problem with a dash lamp on is to check for stored trouble codes. The technician used a jumper between terminals A and H on the DCC (ALCL), and four flashes of the brake lamp indicated a code 4.

Checking a service manual, code 4 was found to be a grounded switch inside the hydraulic control unit. The hardest part about the repair was getting access to, and the replacement of, the defective selectively grounded switch. After bleeding the system and a thorough test drive, the lamp sequence and RWAL functioned correctly.

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REAL WORLD FIX

The Nervous Taurus

A customer complained that, sometimes during normal braking, the ABS would be activated just before coming to a stop. However, the ABS light would not come on. The service technician was able to duplicate the condition and there were no DTCs stored. Using a scan tool to monitor the wheel speed sensors, the technician discovered that the left front wheel speed was slightly different than the others. A thorough visual inspection revealed that the tone wheel (sensor ring) was cracked. This crack created a different wheel speed signal to the ABS controller than the other wheels and the controller activated the ABS as it would normally—that was why there were no DTCs.

Other things that could have caused this problem, which is often called "false modulation," include a bent wheel, mismatched tire sizes, or metal debris around the sensor.

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Figure 107-6 A scan tool is the recommended method to use to access General Motors Teves Mark IV systems.

The diagram shows a hand holding a scan tool cable with a connector that fits into a Data Link Connector (DLC) port on the side of a vehicle's dashboard. Labels include 'DATA LINK CONNECTOR (DLC)' and 'SCAN TOOL CABLE'.

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Figure 107-7 The Delphi (Delco) VI attaches to the side of the master cylinder and connects hydraulically through transfer tube assemblies.

The diagram is a hydraulic schematic showing a master cylinder at the top. It branches into two lines, each leading to a solenoid valve (LF and RF). Below each solenoid valve is a modulation piston (LF and RF). These pistons are connected to the front wheels (LEFT FRONT, RIGHT FRONT). A central rear modulation piston is connected to the rear wheels (LEFT REAR, RIGHT REAR). Labels include 'MASTER CYLINDER', 'LF SOLENOID VALVE', 'RF SOLENOID VALVE', 'LF MODULATION PISTON', 'REAR MODULATION PISTONS', and 'RF MODULATION PISTON'.

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REAL WORLD FIX

The Mystery ABS Amber Warning Light
 The owner of an Acura Integra contacted a service supervisor that the ABS warning light would come on but only when driving down from a parking garage. When the driver turned off the engine and restarted the engine, the ABS amber light would not on and did not come on again until the vehicle was again driven down the spiral parking garage ramp. The service technician used a scan tool and found that the DTCs had been cleared.

NOTE: Older ABS systems will still require a DTC when the evidence is completely gone and the ABS amber warning light is on.

All of the trouble was in excellent condition, but the brake fluid level was about 1/2 inch. After topping off the master cylinder with clean DOT 3 brake fluid, the vehicle was returned to the customer with the following information:

- The ABS amber warning light may have been triggered by the brake fluid level switch, which checks down the brake master cylinder level. The brake fluid reservoir has the fluid level sensor.
- While the brake fluid level sensor normally would turn on the red brake warning light, in some systems it turns on the amber ABS light if the brake fluid falls below a certain level in the ABS reservoir.
- The difference in level would indicate the amount and the amount of brake fluid that has been triggered by a fault code for a brake speed sensor during the drive down the spiral parking garage ramp.

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Figure 107-8 A breakout box is being used to diagnose an ABS problem. The controller (computer) is located in the trunk of this vehicle, and a digital multimeter is being used to measure resistance and voltage at various points in the system, following the service manual procedure.



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TECH TIP

Sometimes It Pays to Look at the Entire Vehicle
 There are often strange electrical problems that can occur including false DTCs or intermittent operation of electrical sensors, ABS, accessories, or gauges. Sometimes the root of these problems is due to rust and corrosion that a vehicle may have been in a flood. Here are some battle signs that a vehicle may have been in a flood or in deep water.

- Mud, salt, or caustic dust under the dash and inside the doors.
- Corroded electrical connectors at the computer, fuse box, or ABS controller (computer).
- Visible water line in the doors or behind panels.
- Rust in abnormal places such as oval springs or brackets behind the dash.
- Moisture in lenses.
- Musty smell and/or strong air freshener smell.
- Powdery corrosion on aluminum parts such as intake manifold and inside the throttle body.
- Rust or moisture inside electrical switches or relays.
- Areas that are normally dusty such as an ashtray or glove box are very clean.

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